

WHAT IS CLAIMED IS:

1. A unipolar drive, comprising:

a booster comprising a first transistor, a first capacitor coupled to a first transistor terminal of the first transistor, and a first inductor coupled to the first capacitor and the first transistor terminal of the first transistor;

an energy storage module coupled to the booster, the energy storage module comprising a second inductor coupled to the first capacitor, a second capacitor connected coupled to the second inductor at a first capacitor terminal of the second capacitor, and a first diode coupled to a second transistor terminal of the first transistor and a second capacitor terminal of the second capacitor, wherein the energy storage module is operable to transfer energy from the second capacitor to the booster using the first diode;

a unipolar inverter, comprising:

a plurality of windings for a motor;

a plurality of second transistors, each second transistor connected in series to one of the windings, and each second transistor operable to cause the respective winding to be energized; and

a plurality of second diodes, each second diode coupled to one of the windings between the respective winding and the transistor in series with the winding, and each second diode operable to return energy from the respective winding to the energy storage module and the booster when the respective winding is not being energized;

a voltage comparator operable to control the first transistor based on a comparison between an output voltage of the booster and a reference voltage; and

5 a hysteresis comparator operable to control the second transistors based on a comparison between a reference frequency and a measured frequency of a motor driven by the unipolar drive.

2. A unipolar drive, comprising:
a booster operable to increase a voltage received
from a power supply to produce an energy output;
an energy storage module operable to store at least
5 some of the energy output by the booster; and
a unipolar inverter operable to energize windings of
a motor using energy from the booster, wherein the
unipolar inverter is further operable to return energy
from the windings to the booster when the windings are
10 not being energized.

3. The unipolar drive of Claim 2, wherein the
booster comprises:
a transistor operable to receive a DC voltage;
15 a capacitor coupled to the transistor; and
an inductor coupled to the transistor and the
capacitor.

4. The unipolar drive of Claim 3, further
20 comprising a voltage comparator coupled to the booster,
the voltage comparator operable to:
compare an output voltage of the booster to a
reference voltage; and
control the transistor of the booster based on the
25 comparison.

5. The unipolar drive of Claim 2, wherein the energy storage module comprises:

an inductor;

a capacitor coupled to the inductor; and

5 a diode coupled to the capacitor and the booster operable to carry energy from the capacitor to the booster.

6. The unipolar drive of Claim 2, wherein the
10 unipolar inverter comprises:

a plurality of transistors, each transistor coupled to a winding of the motor, and each transistor operable to cause the respective winding to become energized; and

15 a plurality of diodes, each diode coupled to one of the windings, and each diode operable to carry energy from the windings to the booster when the windings are not being energized.

7. The unipolar drive of Claim 6, further
20 comprising a hysteresis comparator coupled to the transistors, the hysteresis comparator operable to:

compare a frequency of the motor to a reference frequency; and

control the transistors based on the comparison.

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8. The unipolar drive of Claim 2, wherein:

the power supply provides an AC voltage to the unipolar drive; and

30 the unipolar drive further comprises a rectifier operable to transform the AC voltage into a DC voltage.

9. A method for driving a motor, comprising:
receiving a voltage input from a power supply;
boosting the voltage received from the power supply;
energizing windings of the motor using the boosted
5 voltage;

storing at least some of the energy not used by the
windings to excite the motor; and

when the windings are not being energized, returning
at least some of the energy stored in the windings to the
10 booster.

10. The method of Claim 9, wherein the boosting
step is performed by a booster comprising:

a transistor;
15 a capacitor coupled to the transistor; and
an inductor coupled to the transistor and the
capacitor.

11. The method of Claim 10, further comprising:
20 monitoring an output voltage of the booster;
comparing the output voltage to a reference voltage;
and

controlling the transistor to adjust the output
voltage of the booster based on the comparison.

12. The method of Claim 9, wherein the energy is stored in an energy storage module, comprising:

an inductor;

a capacitor coupled to the inductor; and

5 a diode coupled to the capacitor and the booster operable to carry energy from the capacitor to the booster

13. The method of Claim 9, wherein:
the energizing step is controlled by a plurality of
transistors; and
the returning step is performed using a plurality of
5 diodes coupled to the windings.

14. The method of Claim 13, further comprising:
monitoring a rotation frequency for the motor;
comparing the rotation frequency to a reference
10 frequency; and
controlling the transistors based on the comparison.

15. The method of Claim 9, wherein:
the power supply supplies an AC voltage; and
15 the method further comprises rectifying the AC
voltage to produce a DC voltage.

16. A unipolar drive, comprising:
a plurality of windings for a motor;
a plurality of first transistors, each transistor
coupled to one of the windings and operable to energize
5 the respective winding;
a plurality of first diodes, each diode coupled to
one of the windings;
an energy storage module comprising a first
capacitor, a first inductor, and a second diode; and
10 a booster coupled to the first diodes and the second
diode, the booster comprising a second transistor, a
second capacitor and a second inductor, wherein the
booster is operable to receive energy from the windings
and the energy storage module using the first diodes and
15 the second diode respectively.

17. The unipolar drive of Claim 16, further
comprising a rectifier coupled to the booster, the
rectifier comprising a diode bridge.

20 18. The unipolar drive of Claim 16, further
comprising a voltage comparator operable to control the
second transistor based on a comparison of an output
voltage of the booster to a reference voltage.

25 19. The unipolar drive of Claim 16, further
comprising a hysteresis comparator operable to control
the first transistors based on a comparison of a rotation
frequency of the motor to a reference frequency.

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20. The unipolar drive of Claim 16, wherein there are exactly three windings for the motor, exactly one first transistor coupled to each winding, and exactly one first diode coupled to each winding.